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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/689,462	10/20/2003	Wen-Ting Chu	N1085-00156	4151
54657	7590	03/21/2006	EXAMINER	
DUANE MORRIS LLP IP DEPARTMENT (TSMC) 30 SOUTH 17TH STREET PHILADELPHIA, PA 19103-4196			WILSON, ALLAN R	
			ART UNIT	PAPER NUMBER
			2815	

DATE MAILED: 03/21/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

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<b>Office Action Summary</b>	<b>Application No.</b> 10/689,462	<b>Applicant(s)</b> CHU ET AL.	
	<b>Examiner</b> Allan R. Wilson	<b>Art Unit</b> 2815	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 01 February 2006.  
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-13 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 1-13 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### DETAILED ACTION

Upon further review, the Action mailed on November 1, 2005 is replaced with the following action.

#### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3 and 5-13 are rejected under 35 USC § 102(b) as being anticipated by U.S. Patent No. 6,800,525 to Ryu et al. (“Ryu”) of record.

With regards to claim 1, Ryu illustrates in figures 2a-2q (entire document) providing a substrate 200 having a pair of floating gate layer portions (FIG. 2b 202 under 205), a first conductive material layer 202 between said pair of floating gate layer portions, and a first dielectric layer 205 above said first conductive material layer;

forming a pair of floating gates 211 from said pair of floating gate layer portions using the first dielectric layer 206 (from 205) as a first etching hard mask;

forming a control gate 219 having a second dielectric layer 217 above said control gate, wherein said control gate is self-aligned to said pair of floating gates by using said first and second dielectric layers as a second etching hard mask to remove part of 214b; and

forming a pair of source/drain regions 224 into said substrate and beside said pair of floating gates and said control gate.

Regarding claim 2, Ryu discloses in col. 4, lines 18-20, said first dielectric layer 205 comprises a oxide layer.

Regarding claims 2, 3 and 5, Ryu teach that the second dielectric layer 217 is formed by thermal oxidation (col. 5, lines 27-30, and line 2 teaching the oxidation process may be a thermal oxide) and are thicker in the middle than on an edge (fig. 2k).

Regarding claim 6, Ryu et al. teach the method further comprising:  
forming a second conductive material layer 214 above the substrate;  
forming a hard mask layer 215 above the second conductive material layer;  
removing portions of the hard layer and the second conductive layer (figs. 2h and 2j);  
forming the second dielectric layer 217 above the second conductive layer (fig. 2k); and  
removing a remaining portion of the hard mask layer 215 and an additional portion of the second conductive material layer 214b by using the first 206 and second 217 dielectric layer as said second etching hard mask (col. 5, lines 38-44).

Regarding claim 7, Ryu teach that the second dielectric layer 217 is formed using the hard mask layer 215 as an oxidation resistant layer (col. 5, lines 26-30).

Regarding claim 8, Ryu teach that the hard mask layer is silicon nitride (col. 4 line 67).

Regarding claim 9, Ryu teach that the step of removing the hard mask and second conductive material comprises:

forming a sacrificial layer 216 above the hard mask (fig. 2g);

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removing portions the sacrificial layer 216, the hard mask 215 and the second conductive layer 214 (fig. 2h);

removing a remaining portion of the sacrificial layer (fig. 2k).

Regarding claim 10, Ryu teach that the sacrificial layer 216 is used to planarize a surface of the substrate (fig. 2i).

Regarding claims 11-13, Ryu et al. teach that the sacrificial layer may be an HDP-CVD film (organic), which may function as a photoresist, or a USG (spin on glass) layer (col. 5, lines 9-12).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 4 is rejected under 35 USC § 103 (a) as being unpatentable over Ryu as applied to claims 1 and 2 above, and further in view of U.S. Patent No. 6,706,592 to Chern et al. ("Chern") of record.

With regards to claim 4, Ryu is discussed above, it does not show said oxide layer has a thickness from about 50 angstroms to about 400 angstroms. Chern discloses in col. 6, lines 37-39 a poly layer 62 has a thermal oxide layer 68 has a thickness of 8-80 nm (80-800 angstroms). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have an oxide thickness of about 50-400 angstroms. The motivation for doing this is to

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provide a mask for the etch of the poly layer (Chern col. 6, lines 40-45). Ryu discloses in col. 3, line 58, and col. 4, lines 65-66, both the conductive films 202 and 214 are polysilicon.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

### ***Response to Arguments***

Applicant's arguments filed September 15, 2005 have been fully considered but they are not persuasive.

The argument that “Ryu does not expressly or inherently describe the subject matter of currently amended claim 1, as the fifth oxide film 217 (first dielectric layer) is not used as an etching hard mask to form the floating gates 211” is not persuasive. The first dielectric 206 (formed from the “second” oxide film 205) is used as an etching hard mask to form the floating gates 211 as illustrated in FIGs. 2l and 2m. The second hard mask is formed of first dielectric layer 206 and second dielectric layer 217 to protect the floating gate 211 and control gate 219 from being etched.

Applicant's arguments with respect to claim 4 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from an examiner should be directed to Primary Examiner Allan Wilson whose telephone number is (571) 272-1738. Examiner Wilson can normally be reached 7:00-4:00 Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ken Parker can be reached on (571) 272-2298. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'A. Wilson', with a long horizontal flourish extending to the right.

Allan R. Wilson  
Primary Examiner  
17 March 2006